

Adaptive grazing management on working ranches: Linking decision-making to outcomes



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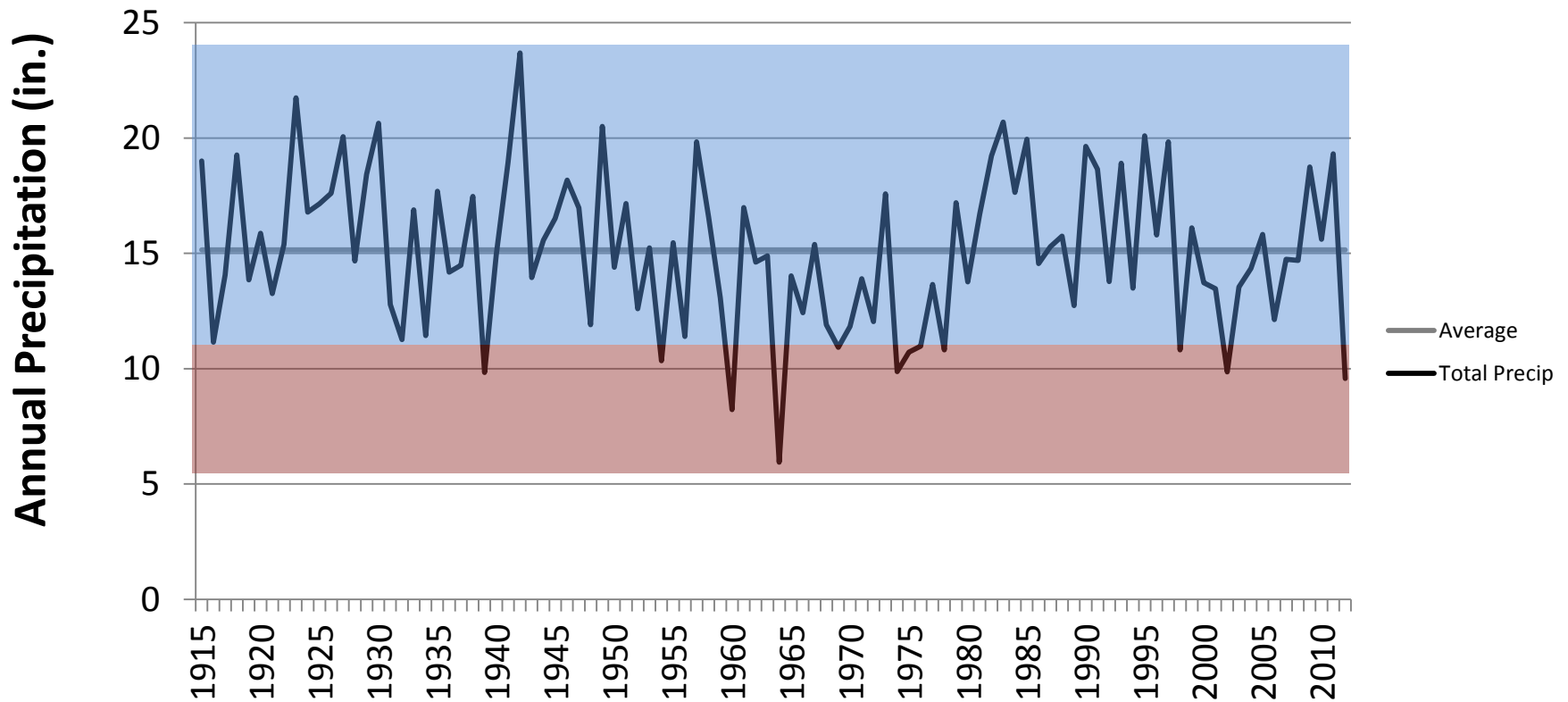


Adaptation



Adaptation to Weather Extremes

Annual Precipitation in Cheyenne, WY

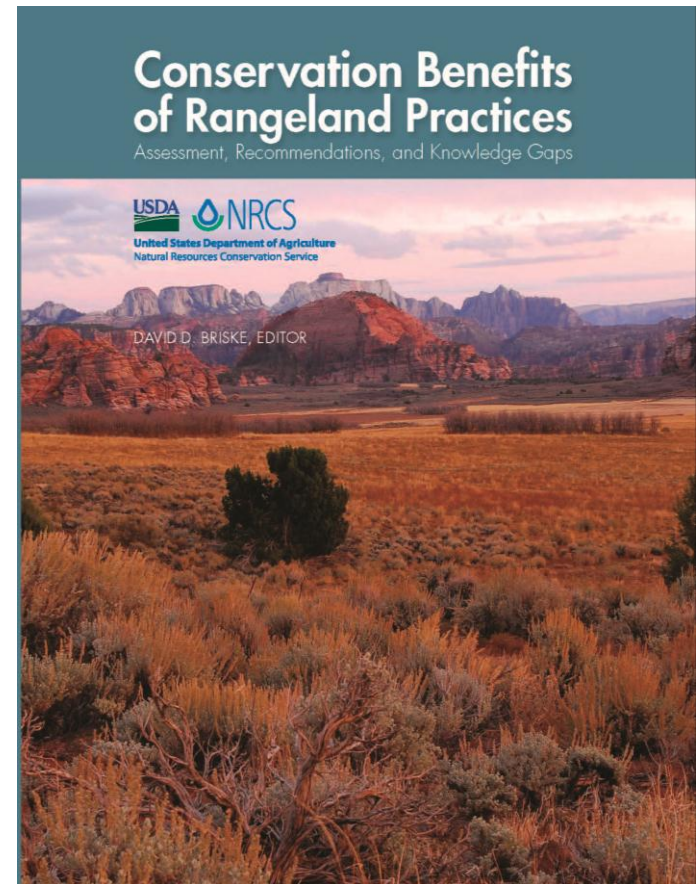


Ability to Learn

Response Diversity

Key Recommendations for Grazing Management and Research

- Use **adaptive management** as a means to optimize conservation benefits following management practice implementation.
- Approaches that involve **integration of ecological scales and human dimensions**, coupled with effective monitoring protocols, will likely drive the next major advance in effective rangeland stewardship.
- **Expand conservation-science partnerships** to capitalize on synergies among scientists, managers, government agencies, and nongovernmental organizations.



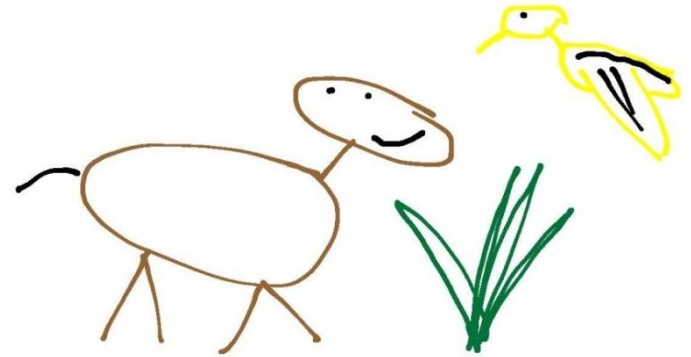
Hypotheses

Adaptation

Better Outcomes

Ability to Learn

Response Diversity



Drawing credit: David Augustine

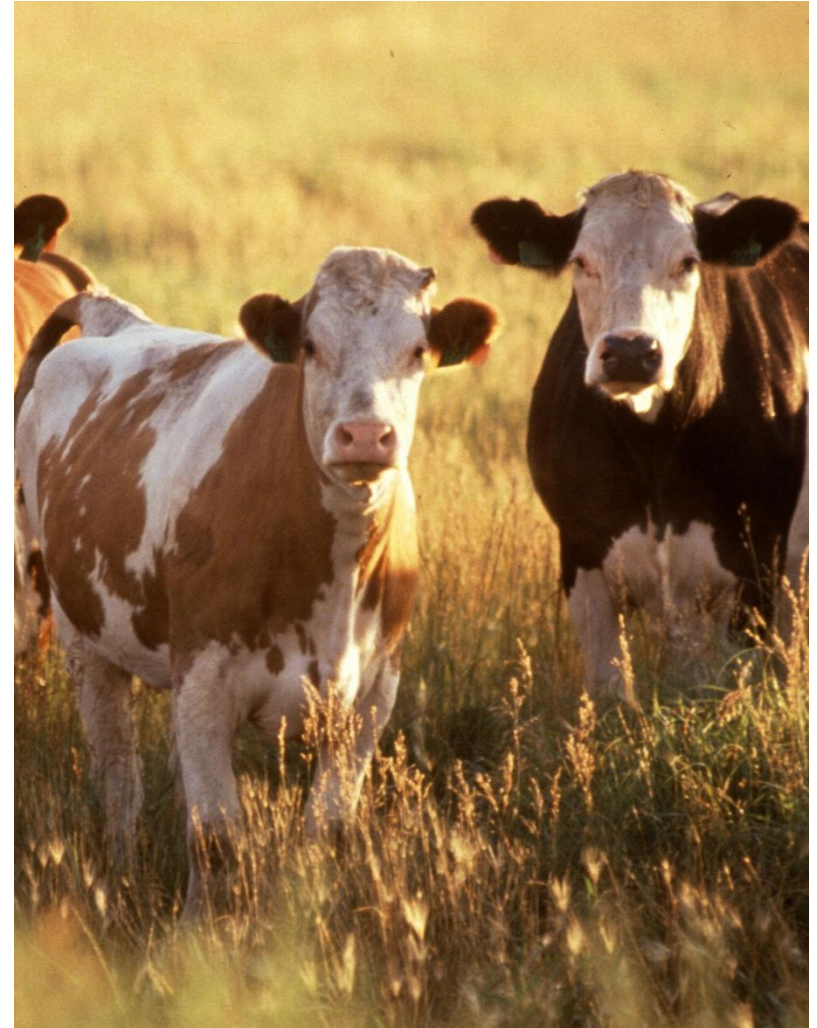
Key Questions

- Does grazing management decision-making on working ranches demonstrate the capacity to adapt?
 - Ability to Learn
 - Response Diversity
- Do adaptive decisions produce better outcomes for production and conservation?



Understanding Adaptation and Outcomes on Working Ranches

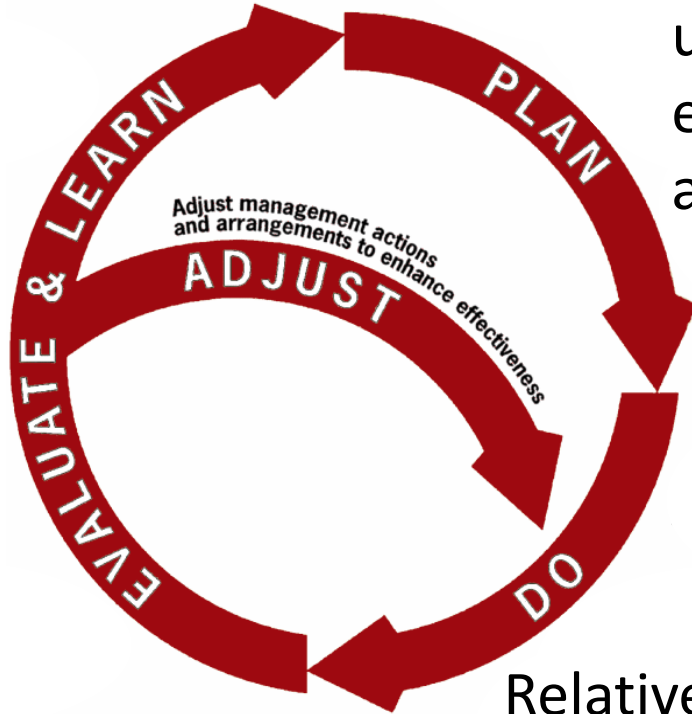
- **Mail survey** completed by 300 ranchers in Wyoming
- **Interviews** with 20 ranchers in southeastern Wyoming
- Observational **field study** begun during 2012 drought
- Long-term **grazing experiment**



Adaptive Management enhances managers' ability to learn from their actions

Made in consultation with others

Consider understanding of ecological dynamics and processes



Result in learning

- Change in mgmt.
- Change in assumptions

Based on monitoring of indicators

Relative to outcomes

Incorporate experimentation

Preliminary Results: Learning

According to interviews, nearly all grazing managers incorporated these elements of adaptive management in decision-making:



Consider understanding of ecology



Monitor indicators

Preliminary Results: Learning

According to interviews, fewer grazing managers incorporated these elements of adaptive management in decision-making:



Experimentation



Involving others

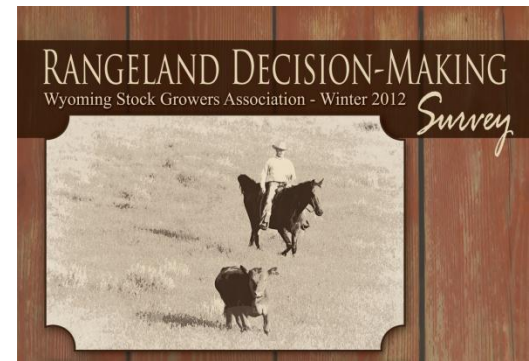
Increasing **Response Diversity** During Drought



Diversity of Drought Management Practices

Pro-active – 81%

Save grass – stock conservatively (48%), rest pastures (47%)



Reactive – 100%

Cut numbers – reduce herd size (80%), wean early (47%)

Find feed – buy feed (63%), rent more pastures (27%)

Managers Increase **Diversity** of Management Practices During Drought

“I think one of the things that drought does, if you’re a manager, instead of seeing it as an obstacle, you see it as a catalyst to make changes you might not ordinarily do.”



“So the last drought was just expensive education to do something different. I think anybody that went through the last drought and didn’t do something before this drought is crazy. And I think most people are doing something.”

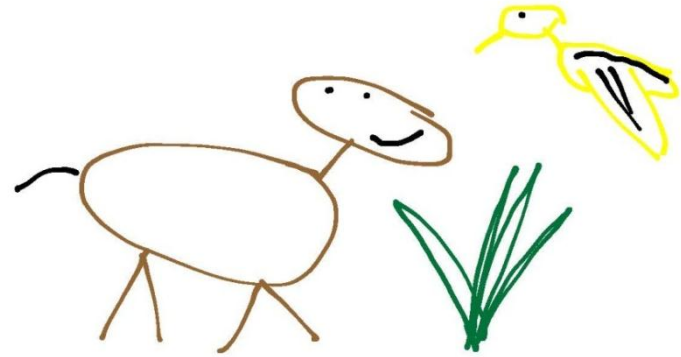
Linking Adaptive Grazing Management Decisions to Outcomes

Observational study

- 2012 and 2013
- Ecosystem service measurements
- At two locations on each ranch
 - Most productive location
 - Location that leaves the most to be desired in terms of production



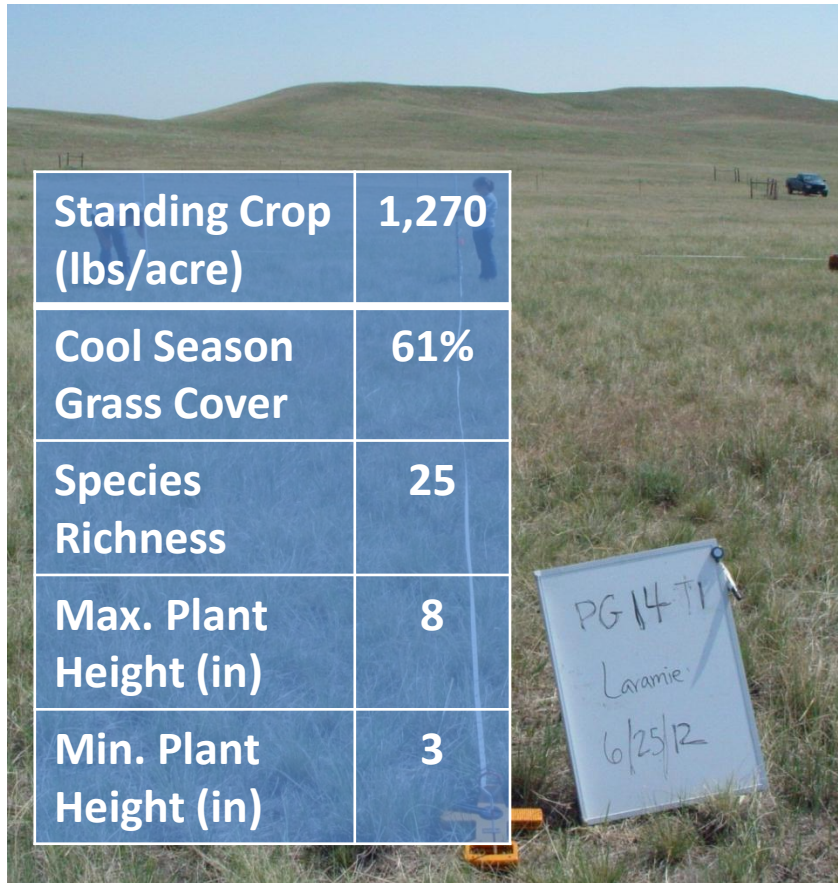
Preliminary Results: Ecosystem Service Indicators



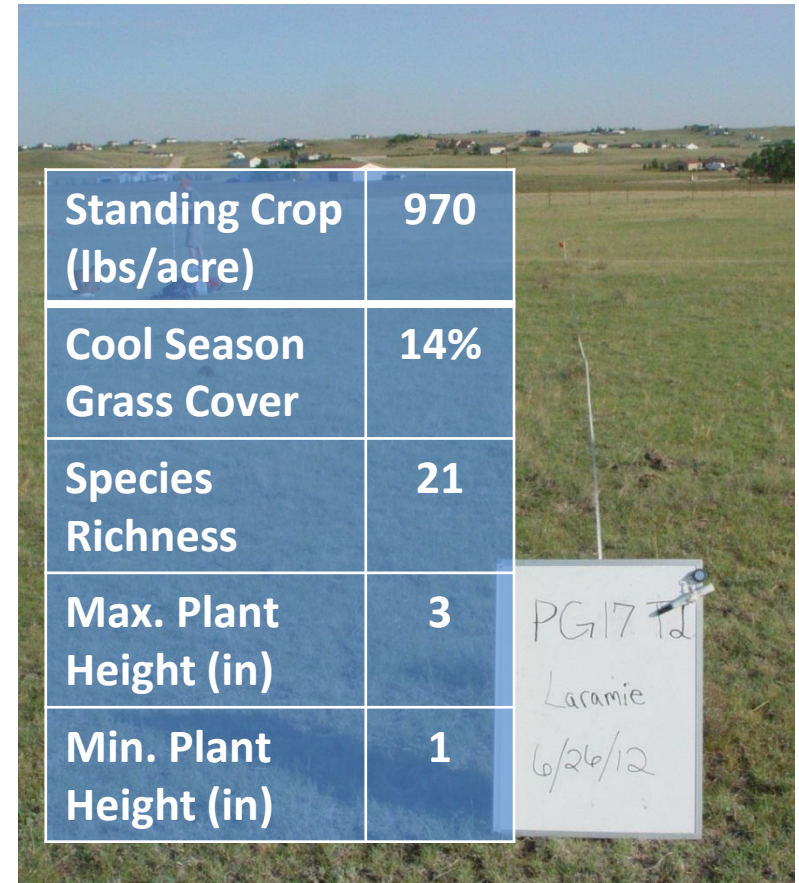
	Loamy	
	Best (7)	Worst (9)
Standing Crop (lbs/ac)	846 ± 146	647 ± 132
Cool Season Grass Cover (%)	38 ± 7	22 ± 6
Richness (# species)	26 ± 2	24 ± 2
Max. Plant Height (in)	5 ± 1	4 ± 1
Min. Plant Height (in)	1 ± 0.5	1 ± 0.5

Long-Term Grazing Experiments

Exclude Adaptation



Long-term Lightly Grazed Pasture

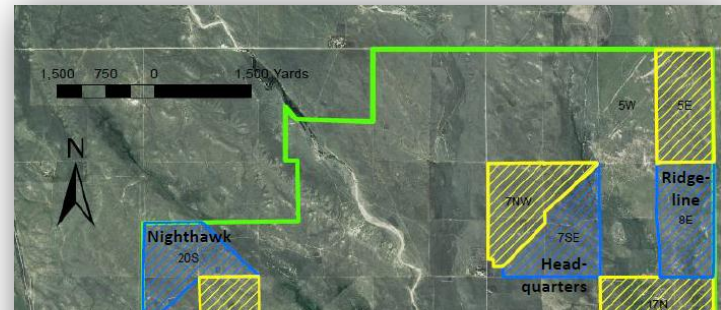


Long-term Heavily Grazed Pasture

Next Steps: Linking Adaptive Grazing Management Decisions to Outcomes

Adaptive Grazing Management Experiment

- Diverse stakeholders manage grazing to achieve multiple goals in 10 pastures
- Ecosystem service measurements



Conclusions

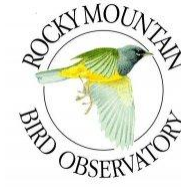
- Adaptive grazing management is alive and well on working ranches
- Opportunities to improve adaptation:
 - Experimentation
 - Involving others
 - Increase diversity of practices
- Stay tuned for more detailed outcomes from the field study and the experiment in 2014

Thanks to our Collaborators and Partners!

Program Leaders: Emily Kachergis, Justin Derner, David Augustine, Leslie Roche, Ken Tate, Valerie Eviner, Mark Lubell, Bethany Cutts, Lorien Jasny, Toby O'Geen, Maria Fernandez-Gimenez, Dave Briske

WY/CO Project Collaborators: Crow Valley Livestock Cooperative, 8A Hay and Cattle Company, Rachel Mealor, Jim Magagna, Rick Peterson, Rachel Murph, Dave Pellatz, Thunder Basin Grasslands Prairie Ecosystem Association

And many more!



Stakeholder Focus Groups



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National Institute of Food and Agriculture



Questions?



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